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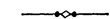
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fasting and prayer were appointed" on account of the threatened calamity.

How shall the ravages of this well-known grasshopper be stayed? We doubt not that when the West is more thickly settled, and the eggs and young of the grasshopper exposed to the attacks of domestic animals, it will be less abundant.

The habits of this species are not well known, except that they appear in mid-summer in the winged state. The wingless larvæ appear in June, and, as Harris recommends, hay crops should be mown early, before they fly in swarms. The last of summer they couple, and probably lay their eggs in holes in the earth, which are hatched in the spring; at least such are the habits of the common Carolina Locust. As Harris suggests, this insect can only be kept under by concerted action on the part of farmers. "In the south of France the people make a business, at certain seasons of the year (probably in the autumn and late in the spring), of collecting locusts and their eggs, the latter being turned out of the ground in little masses, cemented and covered with a sort of gum, in which they are enveloped by the insects." Various forms of drag-nets can be invented for collecting them in large numbers, and run, if necessary, through a field by horse-power. The inventive genius of our farmers will easily suggest methods of gathering these insects by the bushel, when they can be thrown into hot water, and fed to swine. An entomological friend has found by his own experience, that roasted grasshoppers are excellent eating,—"better than frogs." Only let some enterprising genius of the kitchen once set the example of offering to his customers roasted grasshoppers, rare done, and fricasseed canker-worms,—for we have it on the word of an entomologist that caterpillars are pleasing to the palate of man,—and these droves of entomological bees will supplant their vertebrate rivals at the shambles, and instead of cattle-fairs, we shall have Grasshopper Festivals, and County Caterpillar Shows.



GEOLOGY.

THE TWO EARLIEST KNOWN RACES OF MEN IN EUROPE.—Recent discoveries in archæology, now generally accepted among scientific men, tend to show that man has lived many ages before History gives a hint, either by tradition or written record, of his existence. There are races of fossil men, which have peopled certain areas, and then passed away, their places to be filled by new and strange peoples. Thus the study of prehistoric man belongs with the study of fossil animals and plants, or Palæontology. The life of man upon the earth can only be measured *relatively* in the geological scale, not by recorded

years. Thus Palæontology fades into Archæology, or the study of ancient or prehistoric man; and Archæology graduates into History, which comprises the oral or written accounts of man.

Though the subject is still in a crude state, the conclusions here presented result from the careful observation of facts, now generally received by the soundest geologists and archæologists of the day. The majority of ethnologists agree that man had a common origin, and that his birth-place was in the eastern portion of the old world, whence he has migrated westward. In Europe, where the remains of prehistoric man have been most carefully studied, they have been considered to characterize three periods, or ages, namely: first, the *Stone age*, when stone alone, not metals, was used in the construction of implements; second, the *Bronze age*, characterized by a higher style of art, and the use of implements made for the most part of bronze; and third, the *Iron age*, when such implements of the chase, of war, and domestic life, were constructed largely of iron. Each period is a step towards a higher civilization. From being a simple savage, living singly or in small tribes, without organization, and scarcely able to hold his own against the gigantic wild beasts of those times, we trace, by means of the relics of a slowly forming art, the successive steps of man's intellectual and physical elevation. In all his relations our ideal man, representing the human species as a whole, shows a constant progress upwards.

Races of gigantic mammals, such as the Megatherium, Mammoth, and Mastodon, two species of Rhinoceros, the Cave Bear, Lion, Irish Elk, a large species of Beaver, and the Aurochs, have passed away before his attacks. The rudiments of the art of sculpturing and printing appear at a distinct period, the domestic animals are introduced, the cereals and implements for converting them into food appear, something like national unity binds together hordes of savage men, when History lifts the veil. During this long period of more than Cimmerian darkness, the surface of the earth had undergone great changes. It was probably just emerging from the Glacial Period, when the climate of northern Europe and America was much like that of Greenland at the present day, though the extremes of the climate could not have been so great, it seems to us, as generally stated by European writers. All our rivers ran in much deeper channels, while broad estuaries and chains of lakes covered what are now fertile plains and intervals, dotted with towns and villages. It is safe to say, that man lived as long ago as the Terrace or Lake Period of geologists, on which the Glacial Epoch overlapped.

In an interesting article in the London "Quarterly Journal of Science," by W. B. Hawkins, "On the Habits and Condition of the Two

"Earliest Races of Men," the author gives an account of the two races, which succeeded one another during the first, or Stone Period. He states that—

"The gravel-beds of France and England, and the bone caverns of these two countries and of Belgium, have afforded the earliest known traces of man upon the earth. The original discoveries of M. Boucher de Perthes, at Amiens and Abbeville, followed up by the cautious energy of Mr. Prestwich, F. R. S., prove that man coexisted with the fossil mammoth and woolly rhinoceros on the banks of the Somme, at a time when it flowed at a much higher level than at present, and when the relations of hill and valley were altogether different in that district. The labors of the latter, and of Mr. Evans, F. R. S., have resulted in the proof that the same race of men lived in Britain, from Suffolk on the east, as far south as the coast of Hampshire. My own discoveries in Wookey Hole, Hyæna-den, extend their range into Somerset; those of Mr. MacEnery, in Brixham, into Devonshire; and, lastly, those of Dr. Falconer, in Pembrokeshire, into South Wales. Throughout the whole of this area, the same types of flint implements and weapons prevail. A splinter of flint afforded the only cutting edge they possessed; a mass of flint, rudely chipped into a point, was their only boring tool; large, thick, rudely-fashioned 'spear-heads' their principal weapon. The so-called 'sling-stones,' either intended for use as missiles, or imbedded in gum, or bound round with withes, as axes, and some pointed masses of flint which may have been used for digging, comprise the list of their remains from the gravel-beds. . . . The calcined bones on the floor prove that the use of fire was not unknown, and that the cave was inhabited. The evidence afforded by this scant list of the implements and weapons proves that the race of men who used them were savages of the very lowest order, unacquainted with the art of spinning or of making pottery, and living on the fruits of the chase without the aid of the dog. . . . Thus scant is our knowledge of the earliest known men, the Flint Folk par excellence, a race that is as truly fossil and extinct as the Mammoth and Woolly Rhinoceros with whom they lived. To M. Lartet, and the late M. Christy, we owe the proof of the existence of a second race of men in the south of France, in the Department of Dordogne, in the valleys through which flow the Vézère, the Dordogne, and their tributaries. They dwelt in caves and under sheltering rocks, and accumulated around their dwellings the remains of the animals they eat, and vast quantities of the implements and weapons they used. In all the caves and rock-shelters except one, the remains of the Reindeer were most abundant, and evidently constituted the chief food of these savages of the Dordogne, who may therefore be conveniently termed Reindeer Folk, in contradistinction to the Flint Folk described above. The presence of the Mammoth and Cave-lion (the remains of which were few) in the refuse heaps, proves that the age of the Reindeer Folk was that of the great extinct Pachydermata, while the occurrence of the Musk-sheep and Reindeer, animals confined to the cold regions of the north, indicates the arctic nature of the climate at that time in France. The implements are of a higher order, and denote a higher degree of civilization than those of the Flint Folk. . . . The most remarkable remains, however, by far are figures of animals engraved upon stone, antler, bone, or ivory, the earliest traces of sculpture known in western Europe. A slab of schist from Les Eyzies bears the outline of a deer; the lines, however, are too confused for specific identification. The rock-shelter of Laugerie-basse has furnished an outline of the hind quarters of a large ox, boldly and skilfully engraved on the palmated antler of a reindeer. On a second fragment of reindeer antler, the ancient artist has depicted the figure of a horned ruminant, probably the Bouquetin, of which the remains were abundant, and as he had no room to draw the hind legs in their natural position, he doubled them forwards, until the hoofs touched the animal's belly, and thus completed the whole beast. Other fragments of antler, from the same locality, were fashioned into ornamental spoons, or marrow-scoops; and, in one case, a reindeer, kneeling on his forelegs, with eyes, ears, antlers, and tail most distinctly cut, formed the handle of an implement of some kind.

From the rock-shelter of La Madelaine has been obtained most remarkable and unlooked-for evidence of the co-existence of man with the mammoth, in a fragment of fossil ivory, bearing upon it the well-defined figure of the extinct species of Elephant to which it

belonged.* The artist has given to it, not only the tusks with eccentric curvature which are so common in the drift-gravels, but also has marked, in a most unmistakable way, the long hairy mane which we know, from the discovery of the frozen mammoth carcass in the north of Russia, characterized that extinct animal. This specimen, therefore, is most important, not only as an example of the early dawn of art, but also because it stamps the age of the artist to have been that of the Mammoth."

Mr. Dawkins states that the Reindeer Folk seem to have differed from the Flint Folk, "because, although both lived very much under the same physical conditions, in no case are their implements or weapons found together." The implements of the Reindeer Folk indicate a more civilized as well as more modern people, and the small handles of their implements, the similarity of the bone needles, of the marrow-spoons, the habit of carving figures of various animals on bone, etc., and of splitting the bones for the sake of the marrow, and the occurrence of human remains in the refuse heaps of the Reindeer Folk, have caused this fossil race to be compared to the present Esquimaux. It is indeed, as Mr. Dawkins states, not improbable that the Esquimaux, or allied races, formerly ranged as far south as the Alps or Pyrenees.

The differences between these two races are also borne out by other palæontological evidence. With those of the Flint Folk occur remains of the "Sabre-toothed Lion (or Tiger), the Elephas Antiquus, the Hippopotamus, and the Woolly and Leptorhine Rhinoceros," which with the exception of the two last, "began to live in the remote epoch called the Pliocene." In the refuse heaps of the Reindeer Folk, however, only two extinct species of mammalia are found, the Irish Elk, and the Mammoth, "both of which sprang into being in the Pleistocene [or Quaternary] period."

"The three animals that especially characterize the Reindeer deposits of Dordogne, as compared with those of the Flint Folk age, are the Antelope Saiga, the Ibex, and the Chamois; of these, the former ranges now through the great central plateau of Asia, the second lives in the Pyrenees, and the last in the Alps."

After these two races had passed away, their soil was occupied in western Europe by a people whom Sir John Lubbock terms Neolithic (*neos*, young; *lithos*, stone). This race invented the use of pottery, and the art of spinning.

"They dwelt in huts, the bottoms of which are now known under the name of hut circles, which are sunk in the earth, or raised on piles driven into the shallows of lakes, as in Switzerland. The tumult spreading over France, Germany, Britain, and Scandinavia, prove their belief in a future state, as well as their reverence for the dead, whom they buried without burning."

Their implements were elaborated with more skill; they had domesticated the dog, and in the Pile-works of Switzerland are found "the

* Annales des Sciences Naturelles. 5e. ser. t. iv., 6 cahier.

earliest known assemblage of *domestic* animals, the horse, pig, goat, sheep, and ox," and the cakes and seeds found in their dwellings prove that they were acquainted with agriculture. Nearly contemporaneous, or perhaps earlier, lived a similar race in Scandinavia, in whose refuse heaps occur the bones of the Great Auk (*Alca impennis*), which, during this century, has become extinct in Europe and North America, and the Oyster, which they largely fed on, has also disappeared from the Baltic Sea. "The habits of this race were probably similar to the savages of Tierra del Fuego at the present day."

The "Bronze-using Folk arrived in Europe before the dawn of History, and lived there up to the time when history begins. . . . They were acquainted with the use of the potter's wheel, and were in the habit of burning their dead." They used the horse, and had flocks and herds.

The Iron Age came in before the Romans invaded Northern Europe, as they met the Gauls riding in chariots, armed with iron weapons, on the battle-field.

How far these distinctions apply to other countries than Europe, even in the old world, and how far they agree with the very incomplete history of our Aboriginal refuse-heaps, mounds, and relics of American prehistoric races, remains yet to be shown.

MICROSCOPY.

THE VOLVOX AND ITS PARASITE.—In examining with the microscope some specimens of "*Volvox globator*," one was found containing one of the Rotifera, a female of *Notommata Parasitica* (mentioned by Pritchard as sometimes found in such a situation). When first seen it was feeding, picking out the green masses composing the Volvox, and swallowing them, occasionally shifting its position and selecting a fresh spot. Two eggs had been deposited, and another could be seen in the ovary; they were of a reddish tint, and filled with granules. There was no sign yet of organized structure.

Twenty-four hours after, the Rotifer was dead, but the young could now be plainly seen moving in the eggs, and cilia were in rapid vibration at two distinct points. While still under examination, one of the young broke through the envelope surrounding him, and, after a few energetic struggles, was free and swimming rapidly about the interior of his prison, but did not appear to make any attempt to leave it. The egg-shell or membrane left behind was very delicate and transparent, without dots or markings, the aperture broken off by the animal being plainly visible. The other egg would have soon hatched, as the animal was in active motion within it, but unfortunately the water leaking out